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PATENT

1/14/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: ANNAPRAGADA et al.

Application No.: 09/688,021

Filed: October 13, 2000

Title: PROCESS FOR ETCHING VIAS IN ORGANOSILICATE GLASS MATERIALS WITHOUT CAUSING RIE LAG

Attorney Docket No.: LAM1P154/P0696

Examiner: ANDERSON, Matthew A.

Group: 1765

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail to: Box AF, Commissioner for Patents, Washington, D.C. 20231 on January 3, 2003.

Signed: Sue Funchess

Sue Funchess

AMENDMENT B

Box AF
Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the Office communication dated November 20, 2002, please consider the following:

REMARKS

The Examiner rejected claims 1 and 7 under 35 U.S.C. 102(b) as being anticipated by Hung et al. (US 6,387,287 B1). The Examiner stated that Hung et al. discloses in col. 16, lines 1-43 and in Table 10 a method of etching with plasma an organic silicate glass (i.e. the TEOS ARC layer) on a wafer with a gas comprising C4F8 and CF4 and argon, and that in col. 17, lines 20-35, of Hung further suggests the improvement of nitride corner selectivity by the inclusion of a more polymerizing gas such as CH2F2, and that the problems of reduced etch stop can be counteracted by the use of N2 or O2, and that Hung discloses an SiN etch using CH2F2, O2, and Ar in FIG. 11 and that the need for gas chemistry control points one of ordinary skill to the inherent placement of a wafer in a reaction chamber for performance of this process.

Claims 1 and 7 do not recite an organic silicate glass as stated by the Examiner, but instead an organosilicate glass. TEOS oxide of Hung is not an organosilicate glass. TEOS oxide is a silicon oxide grown under PECVD using tetraorthosilicate (TEOS) as discussed on col. 2, lines 43-45, of Hung. Since TEOS oxide is a silicon oxide, not organosilicate glass, Hung does not discloses etching a feature in an integrated circuit incorporating at least one layer of organosilicate glass or etching through the organosilicate glass, as recited in claims 1 and 7. For at least these reasons, claims 1 and 7 are not anticipated by Hung.

The Examiner rejected claims 2-5 and 8-10 under 35 U.S.C. 103(a) as being unpatentable over Hung et al. (US 6,387,287 B1). Claims 2-5 and 8-10 are ultimately dependent on claims 1 or 7, and are therefore respectfully submitted to be patentable over the art of record for at least the reasons set forth above with respect to claims 1 and 7. Additionally, these dependent claims require additional elements that, when taken in the context of the claimed invention, further patentably distinguish the art of record. For example, claims 2 and 8 recite that the etchant gas mixture further comprises CH2F2. Hung in Table 10 teaches using C4F8 and CF4, but not CO or O2 for an ARC open, and then C4F6, O2, CO, and Ar, but not C4F8 and CF4, for the main etch. It would not be obvious to add CH2F2 to C4F8 and CF4, since the nitride corner selectivity provided by CH2F2 is for the main etch, which does not use C4F8 and CF4. The Examiner did not point out why it would be desirable to have nitride corner selectivity during the opening of the ARC, where the nitride corners are not exposed. In addition, the Examiner has not pointed out anything that suggests that CH2F2 would successfully provide nitride corner selectivity when opening the ARC, since Hung only teaches that CH2F2 provides nitride corner selectivity when performing the main etch. In addition, claims 3 and 9 recite that the etchant gas mixture further comprises oxygen. Again Table 10 of Hung teaches away from using C4F8, CF4 and oxygen in the same etchant gas. Instead, Table 10 of Hung clearly shows that C4F8 and CF4 are stopped when oxygen is flowed. In addition, claim 5 recites that C4F8, CF4, CH2F2, oxygen and argon are used to etch the organosilicate glass dielectric. Nothing in Hung suggests that such an etchant gas would be successful in etching organosilicate glass. For at least these reasons, claims 2-5 and 8-10 are not made obvious by the cited references.

The Examiner rejected claims 6 and 11-13 under 35 U.S.C. 103(a) as being unpatentable over Hung as applied to claims 1-5, 7-10 above and further in view of Chiang et al. (US 5,739,579) and Wolf et al. (Volume 1, pp 556). Claims 6 and 11-13 are ultimately dependent on claims 1 or 7, and are therefore respectfully submitted to be patentable over the art of record for

at least the reasons set forth above with respect to claims 1 and 7. Additionally, these dependent claims require additional elements that, when taken in the context of the claimed invention, further patentably distinguish the art of record. For at least these reasons, claims 6 and 11-13 are not made obvious by the cited references.

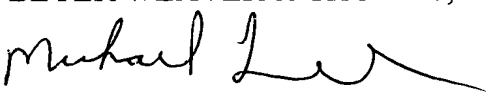
The Examiner rejected claim 14 under 35 U.S.C. 103(a) as being unpatentable over Hung et al., Chang, and Wolf et al. as applied to claims 1-13 above in view of Li et al. (US 6,284,149 B1). Claim 14 is ultimately dependent on claim 7, and is therefore respectfully submitted to be patentable over the art of record for at least the reasons set forth above with respect to claim 7. Additionally, this dependent claim requires additional elements that, when taken in the context of the claimed invention, further patentably distinguish the art of record. For at least these reasons, claim 14 is not made obvious by the cited references.

In view of the above, it is respectfully submitted that the application is in a condition for allowance and action to that effect is respectfully requested at an early date. If the Examiner feels that a telephone conference would expedite allowance of this application, the Examiner is invited to call the undersigned at (831) 655-2300.

The Commissioner is authorized to charge any fees that may be due to our Deposit Account No. 50-0388 (Order No. LAM1P154).

Respectfully submitted,

BEYER WEAVER & THOMAS, LLP



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